

## CLAIMS

What is claimed is:

1. A method comprising:  
  
extracting data from a data stream formatted according to a first network protocol;  
  
storing the extracted data in a buffer based on a first timing signal associated with the data stream;  
  
reading the extracted data from the buffer based on a second timing signal associated with a second network protocol; and  
  
generating stuff bits for a data stream according to the second network protocol based on a phase difference between the first timing signal and the second timing signal.
2. The method of claim 1 wherein generating stuff bits for the data stream according to the second network protocol based on the phase difference between the first timing signal and the second timing signal comprises:  
  
sampling a number of data values stored in the buffer based on the first timing signal;  
  
determining a phase metric based on the number of data values stored in the buffer; and  
  
determining a rate at which stuff bits are to be inserted in a data stream according to the second network protocol based on the phase metric.
3. The method of claim 2 wherein the phase metric comprises an average number of data values stored in the buffer.

4. The method of claim 1 wherein the second network protocol comprises a plesiochronous network protocol.
5. The method of claim 4 further comprising formatting the extracted data and the stuff bits as a data stream according to the second network protocol.
6. The method of claim 5 wherein the data stream according to the second network protocol comprises a DS1 data stream.
7. The method of claim 1 wherein the first network protocol comprises a synchronous network protocol.
8. The method of claim 7 wherein the first network protocol is the synchronous optical network (SONET) protocol.
9. The method of claim 1 wherein the data stream formatted according to the first network protocol comprises a VT1.5 formatted data stream
10. The method of claim 9 wherein the timing signal comprises a clock signal for the VT1.5 formatted data stream.

11. The method of claim 1 wherein the first timing signal and the second timing signal have approximately the same average frequency.

12. The method of claim 1 wherein the buffer comprises a first-in/first-out (FIFO) queue.

13. An apparatus comprising:

- a buffer to store data extracted from a data stream formatted according to a first network protocol, wherein the extracted data is stored in the buffer in response to a first timing signal associated with the data stream and the extracted data is read from the buffer in response to a second timing signal associated with a second network protocol;
- a phase detector coupled to receive the first timing signal and the second timing signal to determine a phase difference between the first timing signal and the second timing signal and to generate a phase difference signal;
- a filter coupled to sample the phase difference signal in response to the first timing signal and to generate a phase metric signal based on the phase difference signal;
- and
- a stuff rate generator coupled to receive the phase metric signal to generate a stuff rate signal based on the phase metric signal.

14. The apparatus of claim 13 wherein the phase metric comprises an average number of data values stored in the buffer.

15. The apparatus of claim 13 wherein the first network protocol is the synchronous optical network (SONET) protocol.
16. The apparatus of claim 15 wherein the data stream formatted according to the first network protocol comprises a VT1.5 formatted data stream.
17. The apparatus of claim 13 wherein the second network protocol comprises a plesiochronous network protocol.
18. The apparatus of claim 17 wherein the data stream according to the second network protocol comprises a DS1 data stream.
19. The apparatus of claim 13 wherein the first timing signal and the second timing signal have approximately the same average frequency.
20. A system comprising:
- a switch fabric;
  - a buffer to store data extracted from a data stream received from the switch fabric formatted according to a first network protocol, wherein the extracted data is stored in the buffer in response to a first timing signal associated with the data stream and the extracted data is read from the buffer in response to a second timing signal associated with a second network protocol;

a phase detector coupled to receive the first timing signal and the second timing signal to determine a phase difference between the first timing signal and the second timing signal and to generate a phase difference signal;

a filter coupled to sample the phase difference signal in response to the first timing signal and to generate a phase metric signal based on the phase difference signal;  
and

a stuff rate generator coupled to receive the phase metric signal to generate a stuff rate signal based on the phase metric signal.

21. The system of claim 20 wherein the phase metric comprises an average number of data values stored in the buffer.

22. The system of claim 20 wherein the data stream formatted according to the first network protocol comprises a VT1.5 formatted data stream.

23. The system of claim 20 wherein the data stream according to the second network protocol comprises a DS1 data stream.

24. An apparatus comprising:  
means for extracting data from a data stream formatted according to a first network protocol;  
means for storing the extracted data in a buffer based on a first timing signal associated with the data stream;

means for reading the extracted data from the buffer based on a second timing signal associated with a second network protocol; and

means for generating stuff bits for a data stream according to the second network protocol based on a phase difference between the first timing signal and the second timing signal.

25. The apparatus of claim 24 wherein the means for generating stuff bits for the data stream according to the second network protocol based on the phase difference between the first timing signal and the second timing signal comprises:

means for sampling a number of data values stored in the buffer based on the first timing signal;

means for determining a phase metric based on the number of data values stored in the buffer; and

means for determining a rate at which stuff bits are to be inserted in a data stream according to the second network protocol based on the phase metric.

26. The apparatus of claim 24 further comprising means for formatting the extracted data and the stuff bits as a data stream according to the second network protocol.